Preface

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Trondheim August 2013,
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1 Introduction

As I am writing this Syria is in turmoil. The anti-government opposition has begged the world for weapons support, and both sides are guilty of terrible war crimes. This comes in the wake of the demonstrations and protests that started in Tunisia, thereafter spreading to Egypt, Libya, and Bahrain, later named the Arab Spring, sweeping the Middle East and North Africa. On the 17th of December 2010 the self-immolation of Mohamed Bouazizi as a protest of police corruption and injustice acted as a catalyst for the demonstrations that spread throughout the Arab world (Fahim 2011). Tunisia and Egypt were the first to witness major protests, then the Arab Spring spread to Algerie, Yemen, and Jordan (Raghavan 2011). Suggested causes of the Arab Spring lie in dissatisfaction with local government rule, human rights violations, political corruption, economic decline, unemployment, and increasing food prices paired with global famine (Breisinger, Ecker, and Al-Riffai 2011).

According to Khalidi (2011) revolts have been occurring in the Middle Eastern and North African region since the 1800's, but only in recent years have these revolts turned inward, being directed away from foreign governments and instead focused on problems in the Arab society itself. The outcomes of the Arab Spring varied greatly across the countries affected, and still does. In Tunisia and Egypt, Ben Ali and Mubarak, respectively, conceded power. In Libya and Syria political violence broke out leading to civil wars that are still ongoing today. Leaders in Saudi-Arabia and Kuwait managed to pacify the protesters by increasing benefits to the people (Hodler 2012).

From the examples mentioned above, it is clear how different the Arab Spring affected many countries: some leaders conceded power nearly peacefully whereas others led their people into civil war. My main research aim is to understand the different responses to the Arab Spring, and to see whether similar patterns apply in the rest of the world. I will base my empirical study on a theory by Hodler (2012), which suggests a connection between oil abundance and the leader's affiliation to the ethnic minority group in the country and the onset of civil war. I have extended Hodler's (2012) theory so that I not only test whether this connection affects conflict in the Arab countries, but also in the rest of the world.

To understand why the heads of state responded so differently to the Arab Spring Hodler (2012) devised a stylized model based on the anecdotal evidence of the outcomes seen in the Middle Eastern and North African region up until then. He proposed that a dictator affili-

ated with the ethnic minority in an oil abundant country would use the oil incomes to pay his own ethnic group to fight the protesters, a good example is Syria where Assad belongs to the Alawi minority and the country has intermediate oil incomes. If the country is oil rich but the leader is affiliated with the ethnic majority, Hodler (2012) proposes that the leader will bribe all citizens to calm the protests, such as in Kuwait where the government offered a hand-out of 4,000 USD per person in addition to roughly a year of free food (Hodler 2012).

The anecdotal evidence supports the pattern predicted by Hodler's (2012) model, and the theory seems to give a good explanation as to why the heads of state acted so differently in reaction to the protests of the Arab Spring. This model's focus on the leader's affiliation with either the minority or majority ethnic group is novel, and though the model is stylized, it may help shed light on political violence in divided societies even outside the Arab world. Hodler's (2012) paper is purely theoretical. I have used his model to test if its predictions are true on an empirical plane, testing the model both in Arab regions alone and in the world.

Can a leader affiliated with the ethnic minority in an oil abundant country account for the outbreak of conflict in the Arab regions following the Arab Spring? Can the interaction between these two variables explain conflicts that have broken out in other parts of the world?

To test Hodler's (2012) theory and answer the questions above in an empirical framework I have utilized a new study from Cotet and Tsui (2013) where they present a unique new data set and argue for a new measure of oil abundance. The standard measure has been oil exports as a share of GDP, but this measure has recently gone though scrutiny as it may be suspected of endogeneity. I therefore follow Cotet and Tsui (2013) and utilize oil reserves as a proxy for oil abundance. In interacting oil reserves with a dummy corresponding to the leader's affiliation with the minority ethnic group, and using control variables standardized in conflict literature by Fearon and Laitin (2003), I test whether Hodler's (2012) theory can explain the outbreak of conflict in the world generally and specifically in the Middle East and North Africa where the Arab Spring unfolded.

In addition to looking at the effects on the outbreak of civil war, I also want to see if the leader's affiliation to the ethnic minority combined with oil wealth has an effect on military expenditure as Cotet and Tsui (2013) found that oil rich non-democracies tend to have higher defense burdens. As Hodler's (2012) theory suggests, the minority leader of an oil rich

country will pay the people from his own ethnic group to fight down oppression; military expenditure, which can be interpreted as a political entry barrier, is a good measure for this.

My main goal is therefore to examine whether or not military expenditure or the onset of civil war is affected by a head of state from the country's ethnic minority combined with oil abundance. To test whether the onset of civil war is affected I use a logit model as my dependent variable in this case is binary, being represented by a dummy variable from Fearon and Laitin (2003) equaling one if there is a civil war, and zero otherwise. To examine the effects on military expenditure I utilize pooled OLS for easy comparison with previous studies, as this is the most commonly used estimation method. In addition I use fixed effects to control for other possible country-specific omitted factors that do not vary over time.

The motivation behind this is that if it is found that the onset of civil war, and increased military spending, which may be a sign of oppression, is affected by leader affiliation and oil wealth, then this has major policy implications both for individual countries and for the world as a whole. It might help explain the different reactions to the Arab Spring now seen around the Middle Eastern and North African countries and give forewarnings of similar situations that may arise in the future. To understand why some countries experience civil wars while others do not is in and of itself an extremely important question which should be taken very seriously as the consequences of civil war are devastating.

I find that having a leader affiliated with the minority ethnic group increases the likelihood of conflict positively both in the world and in the Arab regions specifically when using the logistic estimation method. The interaction term combining leader affiliation and oil wealth is not significant however, and becomes negative in the Arab regions, though it must be mentioned that restricting the sample to only include the Arab regions gives very few observations, which may affect the results.

For military expenditure there is little statistical significance in the estimated results. Only in the subsample containing countries in Arab regions estimated by pooled OLS is the interaction term between oil and leader affiliation significant, though it is negative which contradicts the theory. Minority leader and oil reservers are positive and statistically significant in this specification, but a closer look reveals that oil reserves affect military spending less (though still positively) when the country is controlled by a minority leader.

My main results also encompass other regional specifications, not just for the Arab regions (though this is the most interesting according to the theory). In both Asia and Sub-Saharan Africa a leader affiliated with the minority ethnic group combined with oil wealth leads to increased probability of civil war onset. In addition, oil reserves in these two regions affect the probability of civil war more when the leader is affiliated with the ethnic minority. This is the strongest evidence I have for Hodler's (2012) theory being able to account for civil war outbreak.

All in all it seems as though the results of my estimations give little support for Hodler's (2012) theoretical model, the significance of my estimated results are rather low, indicating that in most specifications there is little or no association between oil wealth, a head of state from the ethnic minority and civil war onset or military expenditure.

This thesis proceeds as follows. Section 2 gives an overview of previous literature concerning fields of conflict and civil war, ethnic fractionalization, and resource abundance. Hodler's (2012) theory is presented in section 3. Section 4 gives a detailed explanation of the empirical methods used in the estimations, whereas section 5 gives an overview of the data, and how the variables in the base line equation are defined. Section 6 presents the main results. In section 7 several alternative specifications have been applied to the data, showing the sensitivity analysis. Lastly concluding remarks and a brief summary is given in section 8.

2 Previous Literature

This thesis connects and extends to literature concerning several important and widely researched economic topics, most obviously the conflict literature, but also literature concerning the resource curse and the effect of ethnic diversity on a country's economy. The research papers written on these topics are numerous, and the scope of this thesis cannot do justice to them all, but in the following subsections a discussion on the previous literature most influential to this paper is given.

2.1 Conflict and Civil War

Since 1960 one fifth of the worlds nations have experienced wars or conflicts that have lasted 10 years or more (Blattman and Miguel 2010). Civil wars are far more common than international conflicts according to Collier and Hoeffler (2004), and a trend in civil war literature has been the betterment of civil war data sets. There are several ways of defining civil war; Collier and Hoeffler (1998) define wars in terms of violence, and create an operational measure for civil war based on 4 dimensions using the data set of Small and Singer (Small and Singer 1982, cited in Collier and Hoeffler 1998). Firstly, one of the primary actors must be the national government in power. Secondly, both sides must possess the ability to inflict death upon the other. To separate wars from massacres, a rule of thumb is that the stronger forces must sustain at least 5% of the number of deaths suffered by the smaller force. Lastly, there must be at least 1000 battle related deaths per year.

Gleditsch (2004) suggests some revisions to the Correlates of Wars project's list of wars, and creates a data set which has later been widely used. The COW project suggests a definition of war which states that violent armed conflicts are wars if there are more than 1000 battle deaths, which in the case of civil wars, includes both military and civilians. This threshold has by some been criticized as arbitrary, but on the other hand a relatively high threshold, like 1000 deaths, ensures that the conflict incidents are relatively well defined. Another popular measure is encompassed in the ACD variable; an alternative measure of conflict based on the Armed Conflict Database compiled by Gleditsch et al., this measure sets the threshold at 25 battle deaths per year, often named civil conflict as opposed to civil war. (Gleditsch et al. 2002, cited in Brunnschweiler and Bulte 2009). Brunnschweiler and Bulte (2009) comment that it is interesting to see if small scaled violence responds to the same triggers as civil war, though their results suggests it does not. This measure has also

been accused of having an arbitrary threshold.

The standard explanation of civil war has been categorized into two main schools of thought: greed; the opportunity for rebels to win riches, and grievance; which defines a behavioral paradigm stemming from social exclusion, inequality, or the like (Brunnschweiler and Bulte 2009). Collier and Hoeffler (1998) look at the economic causes of civil war, presenting a model based on utility theory where rebels will start a civil war if the benefits outweigh the costs of warfare. They find 4 variables that are significant determinants of civil war; initial income, the ELF-index[1], initial population size and the amount of natural resources a country possesses. In their paper they hypothesize that the coordination costs are at their lowest when the population is polarized between ethnic groups (the middle range of the ELF index), and therefore conclude that polarization is a significant cause of civil war. More recently there has been increasing focus on ethnic conflict. Caselli and Coleman (2013) explain this as a result of coalitions forming along ethnic lines to compete for a country's resources. They argue that in homogenous societies, the members of losing ethnic groups can more easily blend into the winners group, and argue that this rules out conflict as an equilibrium outcome because the winning group knows it cannot effectively exclude the losing side from the spoils of war.

One important trend in civil war literature has been the convergence towards a standard model on civil war onset, based on the very influential paper by Fearon and Laitin (2003), where they attribute civil war onset to factors favoring insurgency. Insurgency is defined as a technology of military conflict characterized by small, lightly armed bands practicing guerrilla warfare from rural base areas. The factors that favor insurgency are the following: a newly independent state, for example one that loses the backing of a former imperial power, political instability, and an anocratic government which is an indicator of a weak and incapable state. Being able to hide from the government forces is important, therefore a large population and a territorial base separated from the states' center are also important indicators. Further, a country which receives weapons from foreign governments is also at risk. And lastly; a country's resources plays an important role; a land that supports the production of high-value, low-bulk goods, such as diamonds or drugs, favors insurgency, as does a state whose revenues derive primarily from oil exports. Oil producers tend to have weaker institutions, and in addition oil revenues increases the prize of controlling the state.

[1]Ethno-linguistic fractionalization, see subsection 2.2

Fearon and Laitin (2003) find that the risk of violent civil war on the worlds countries over the period from 1946 to 1999 has been more or less constant though they have been more difficult to end. In their paper they argue that civil war cannot be explained by factors concerning ethnicity or religion, but rather that civil war is explained by factors that favor insurgency, such as poverty, rough terrain and a large population. They find that at any level of ethnic diversity, which they measure both as fractionalization using the ELF-index and as polarization using a dummy variable, the odds of civil war decreases as one moves up the income scale. This posts a strong counter-argument for the hypothesis suggested in this thesis.

2.2 Ethnic Diversity

In recent years it has become more common among economists to include an index of ethnic diversity, especially in growth estimations but also in connection to research regarding conflict. The reasons for this are many; some argue that ethnically diverse societies have a higher probability of conflict and/or corruption which in turn will lower investment and productivity. Also, trade may be restricted to individuals belonging to the same ethnic group. Collier and Hoeffler (1998) argue that the index used for ethnic fractionalization can be seen as a proxy for coordination costs in their model for economic causes of civil war. They hypothesize that coordination costs are at their lowest, meaning that the probability of civil war is at its highest, when the population is polarized between an ethnic group identifying with the government and a similarly sized group that identifies with the rebels.

In this section I will be describing different ways of measuring ethnic diversity and some results from previous work connected with these measures. In addition, I will also look into how leader affiliation can be measured and what results such measures have provided.

2.2.1 Ethnic and Linguistic Fractionalization

ELF, which is the most commonly used index of fractionalization, was originally calculated by Taylor and Hudson, and was compiled in the former Soviet Union based on the Atlas Nadorov Mira (ANM) data set (Taylor and Hudson 1972, cited in Alesina et al. 2003). The ELF-index shows us the probability of two randomly selected people from a population belonging to separate groups. The index will increase with the total number of groups while

holding the distribution size across groups constant, and it will increase as one changes the distribution towards greater equality among the groups. Fearon, Kasara, and Laitin (2007) point out that these are both desirable properties in a measure of diversity. Most of the studies using the ELF-index find no impact from ELF on the onset of civil war, prominent among these studies are Fearon and Laitin (2003) and Collier and Hoeffler (2004).

A critique of the ELF-index has been carried out by Laitin and Posner, they claim that; (a) the ELF-index does not allow for variation over time, (b) a single index may not be enough to capture the multidimensional qualities of ethnic identity, and (c) the ELF-index does not include the role of the state, which is obviously very important when it comes to all civil wars (Laitin and Posner 2001, cited in Cederman and Girardin 2007).

The ELF-index is just one way of measuring ethnic diversity. Montalvo and Reynal-Querol (2005) argue that the reason many studies find no relationship between ethnic fractionalization and ethnic conflict or civil war may be that the classification of ethnic groups used in the ANM, which is the source of the ELF-index, is not properly constructed. Blattman and Miguel (2010) states that most measures of fractionalization are utilized because they are easy to compute, and not necessarily because they encompass the underlying theory. Fortunately, there has been some progress on the field, I will describe some alternative indices and measurements below.

Alesina et al. (2003) provide a new measure of ethnic, linguistic and religious fractionalization and use this to examine old evidence. The same formula as for ELF is used, but is applied to different underlying data, hence dealing with the issue of classification surrounding the ANM. They create one separate measure for ethnic fractionalization, one for linguistic and one for religious fractionalization. These measures are widely used.

Cederman and Girardin (2007) introduce a new index of ethno-nationalist exclusiveness, N^*. They find that escalation to violence is more likely when the dominant group consists of a demographic minority, so conflict is assumed to occur whenever demographically important groups are excluded from power.

Table 1 shows N^* compared with the ELF-index[2]. With the N^*-index there will be a

[2]In table 1 N^*(r,k) r is a threshold parameter indicating at what demographic balance the odds are even for a challenge: 0.5. k is a slope parameter; $0 \leq k \leq \infty$ (Cederman and Girardin 2007)

higher probability of conflict when the ethnic group in power (EGIP) is smaller relative to other groups, but as we can see, ELF does not change with the composition of the group.

Table 1: Examples of Group Configuration

Group Configuration	ELF	N*(0.5,5)
(**0.5** 0.5)	0.5	0.5
(**0.7** 0.3)	0.42	0.072
(**0.3** 0.7)	0.42	0.843
(**0.3** 0.3 0.2)	0.74	0.716
(**0.2** 0.2 0.2 0.2)	0.78	0.937

Note: EGIP's in bold

Cederman and Girardin (2007, 177)

The ELF-index will increase as the number of groups increases, whereas the N^*-index will increase when the dominant groups' share of total population declines. With this measure they claim to cast doubt on the tendency to ignore ethnic politics when explaining the reasons for civil war.

2.2.2 Ethnic Polarization

Montalvo and Reynal-Querol (2005) argue that claiming a positive relationship between fractionalization and potential conflict also implies that the more ethnic groups there are in a society, the higher the probability of conflict. Many disagree with this type of reasoning, amongst them Donald L. Horowitz, a specialist in the study of ethnic conflict, who argues that the relationship between ethnic diversity and the onset of civil war is not monotonic; an observed tendency towards less violence in societies at either extreme, that is; very homogenous or very heterogenous societies (Horowitz 1985, cited in Montalvo and Reynal-Querol 2005). On the other hand, societies that encompass a large minority facing an ethnic majority experience more violence. Based on these arguments Montalvo and Reynal-Querol (2005) state that polarization is a better measure for capturing the likelihood of (potential) conflict. Through their empirical results Montalvo and Reynal-Querol (2005) show that the index of ethnic polarization is a significant explanatory variable for the onset of civil war. With these results in mind, it may seem as though the weak explanatory power found in the aforementioned papers is due to the use of fractionalization instead of polarization. I will therefore include a measure of polarization among my control variables, and use the ELF-index based on Alesina et al.'s (2003) research as a sensitivity analysis.

In addition to using a measure of ethnic diversity as a control variable I will, to follow Hodler's (2012) theory, include a measure of the ethnic affiliation of the head of state as a main explanatory variable. A major point in the theory being that a leader affiliated with the countries minority combined with oil wealth should increase the probability of civil war. In the next subsection I will describe how this data was found and what results previous research has given on the subject.

2.2.3 Leader Affiliation

Fearon, Kasara, and Laitin (2007) comment on Cederman and Girardin (2007) and look into whether countries will be at greater risk of civil war if the state is controlled by an ethnic minority. They do this by using new data on the ethnicity of the country's leader, and find a weak tendency for states with a minority leader to have a higher risk of civil war, though this effect is not significant. The result does not change when using the N^*-index. In this paper they argue that the impact from using N^* in Cederman and Girardin (2007) comes only from the three countries that have experienced a civil war and that have also had a minority ethnic group in control. Further, Feraon, Kasara, and Laitin (2007) uses leader ethnicity instead of the EGIP-measure, they now find a slightly higher probability of civil war when the leader belongs to the country's minority, though the estimates are small and uncertain. The conclusion here is that it is not likely that ethnic minority dominance explains much variance in civil war propensities.

In Fearon, Kasara, and Laitin (2007) the leaders ethnicity is used as an indicator of ethnic influence over the state. There are some minor problems in using this method, for example in 1963 Britain had a Scottish Prime Minister, but this does not indicate that Britain was under ethnic minority rule. These problems are easily solved by either dropping such cases from the sample, or by simply coding them as ethnic majority rulers. In any case, these observations are few, and the advantages of using the head of state as an indicator are far greater. Fearon, Kasara, and Laitin (2007, 190), state that the ethnicity of the head of state "does an excellent job of picking out the group locally regarded as the politically most powerful...". In addition this measure varies over time in many countries, which means it is possible to examine whether civil wars tend to begin when a leader from the ethnic minority is given power.

Though the conclusions reached in Fearon, Kasara, and Laitin (2007) goes against the predictions of the theory Hodler (2012) has suggested, Fearon, Kasara, and Laitin (2007) have not interacted this term with oil wealth, which may cause different results to appear in this thesis.

2.3 The Link Between Oil Wealth and Civil War

Until the 1980's it was believed that resource abundance was advantageous, but in the 1990's the opposite became common knowledge and named "the resource curse" prompting a large number of research papers on the topic. Current literature concerning the resource curse distinguishes between 3 different dimensions: lower economic growth, violent conflict and undemocratic regime types. (Brunnschweiler and Bulte 2009). I will focus specifically on the literature concerning how resources are linked to conflict and civil war. For more on the link between resources and growth see e.g. Sachs and Warner (1995); on resources and democracy see e.g. Cuaresma, Oberhofer, and Raschky (2011) and Tsui (2011).

Collier and Hoeffler (1998) wrote a very influential paper describing the effect of natural resources as non-monotonic, stating that initially resources would increase the duration and risk of war, but then reduce it, finding the maximum risk at 27% of GDP. Humphreys (2005) criticizes earlier researches, stating that it has focused on the correlation between conflict and resource wealth without giving much thought to identifying the particular mechanisms underlining these correlations, and argues further that econometric tests on the effect of natural resources on conflict suffer from problems concerning data and model specifications. Ross (2006) develops a new measure and test to deal with issues concerning measurement error, endogeneity and the uncertainty about the causal mechanisms. He argues for the existence of a resource curse, stating that previous case studies "Collectively [...] imply that some version of the natural resource–civil war link is valid within certain countries, even if they cannot tell us whether it is valid cross-nationally" (Ross 2006, 275). He further sums up 5 mechanisms in which natural resources are tied to the onset of civil war (this is further discussed in Humphreys [2005]). The first two claims that resources affect rebels' motivation, giving them incentives for starting a war. The last three concern giving rebels the opportunity through financing or by weakening the state. In an earlier article Ross (2002) argues that natural resources are never the only source of conflict, but that the presence of natural resources heighten the danger of war, as well as making it harder to resolve. Brunnschweiler and Bulte (2009) on the other hand, find evidence suggesting that conflict increases resource depen-

dence, not the other way around. They argue that natural resource wealth will, through an income effect, lower the probability of conflict, but they as Humphreys (2005), comment on the fact that researchers have been silent on the exact mechanisms linking resource wealth and civil war onset.

In the literature resource abundance has most commonly been measured as primary commodity exports as a share of a country's GDP, often called sxp. For oil wealth specifically the measure is oil exports divided by GDP. This was originally used by Sachs and Warner (1995) and later adopted by Collier and Hoeffler (1998). More recently, this measure has been under scrutiny in several studies. It has been pointed out, by Ross (2006) and Fearon (2005) amongst others, that the sxp measure lumps together a wide range of goods. Humphreys (2005) states that when using oil exports as share of GDP, re-exports are also included. That is; primary commodities that are shipped through the country but are not necessarily produced there, are included in the measure. To cope with some of the problems connected with sxp, Humphreys (2005) uses resources per capita, but Ross (2006) points out that this measure might also be biased in more subtle ways. One way of addressing the endogeneity problems connected with the sxp measure is to use a dummy variable, but this choice comes with a high cost, as the thresholds are often quite arbitrary and the measure carries no information about the value of the resource in question.

Cotet and Tsui (2013) uses oil reserves as a measure of oil abundance. When utilizing oil reserves, they find that larger oil reserves are associated with a higher probability of the onset of civil war, though this association disappears when controlling for country-specific omitted variables that do not vary over time (for example terrain). Production is another variable that has often been used as a proxy for oil abundance in previous work (e.g. by Cuaresma, Oberhofer, and Raschky 2011). Cotet and Tsui (2013) argue that there is measurement error in production causing the estimates to be biased and inconsistent, the reason for this is that production understates the oil wealth of swing producers that produce below their full capacity.

When looking at the outcomes of the Arab Spring thus far, and the theory Hodler (2012) devised because of this, oil seems to be a curse when combined with a minority leader. In an earlier article he finds that the resource curse is indeed more pronounced in highly fractionalized countries (Hodler 2006). As an example of the empirical evidence supporting this

claim he uses Norway with a fractionalization index of 0.06 and Nigeria with an index of 0.85 (indices taken from Alesina et al. [2003]).

The main empirical findings concerned with the resource curse is that oil abundance will lead to civil war, but Cotet and Tsui (2013) find that when using country-fixed effects this statistical association disappears. They also conclude that oil-rich countries do not have a higher rate of coups or irregular leader transitions. So, why do so many studies find empirical support for the resource curse? The answer might lie in the model specification, as mentioned the results vanish when Cotet and Tsui (2013) apply fixed effects. Also, the conventional measure, oil exports as fraction of GDP, has been criticized lately. Cotet and Tsui (2013) mention that problems with omitted variables, endogeneity bias and measurement errors may be responsible. An interesting find in the paper is that oil-rich non-democracies seem to have a larger defense burden than other countries, the logic behind this being that these countries will expand military expenses to deter political challenges and the dictators in these countries will run oppressive regimes to stay in power.

3 Theory

The theory in this thesis is in its entirety based upon Roland Hodler's "The Political Economy of the Arab Spring" (2012), where a theory on the connection between the country's oil revenues, the leader's ethnic or religious affiliation and the leader's response to the demonstrations in connection with the Arab Spring was put forward. In this section I will present his theoretical model, and also explain how I plan to use and expand this theory in my thesis.

The Arab Spring created a window of opportunity for democratization for many of the Middle Eastern and North African countries. A major slogan sweeping the Arab world during the demonstrations was "Ash-sha'b yurid isqat an-nizam" ("The people want to bring down the regime") (Uriel 2011). The leaders of the Arab countries that were affected chose very different responses to this wave of protests.

According to Hodler (2012) a country's leader has two responses should he desire to stay in power: either bribe all citizens and in that way calm the crowds and stop the uprisings, or rely on the members of his own ethnic or religious group to suppress the protesters. Hodler (2012) argues that the dictator's choice will depend on his country's oil revenues and also which ethnic or religious group the dictator belongs to. In his article we are presented with predicted outcomes according to different combinations of the dictator's affiliation and oil revenues. I present the predicted outcomes in equilibrium from Hodler's (2012) model in table 2.

Table 2: Leader Affiliation and Oil Wealth

	Country is oil rich	Country is oil poor
Majority leader	Bribe all citizens	Concede power
Minority leader	Violent suppression	Concede power

Table 2 shows the possible outcomes from different scenarios according to the theory. If, for example, the head of state is affiliated with the country's ethnic majority and the country is endowed with oil wealth, then the outcome predicted by the theory is that the head of state will choose to bribe all citizens. If, on the other hand, the country's leader belongs to the minority ethnic group and the country has no, or very little, oil wealth then the outcome should be for the head of state to concede his power. The possibility being tested in this thesis is whether a leader form the minority ethnic group combined with oil wealth will lead to violent suppression or civil conflict.

Hodler (2012) has chosen to study separately whether the dictator is affiliated with the minority or majority group in his country. This is one aspect of Hodler's (2012) paper that differs from earlier work on political transitions from dictatorship to democracy. In earlier work, examples being Acemoglu and Robinson and Lipset (Acemoglu and Robinson 2001, 2006 and Lipset 1950, cited in Hodler 2012), the citizens who are excluded from power form a homogenous group, but in Hodler (2012) these citizens are divided into different ethnic or religious groups. An obvious assumption in the article is that the dictator is able to discriminate between the groups. The reason for separating citizens into heterogenous groups is that they can expect different things from democratization. This difference is the reason the political transitions in Hodler's (2012) paper can be either peaceful or violent in equilibrium, whereas in previous work, transitions can only be peaceful.

A dictator from the minority group is more likely to choose the violent option unless oil revenues are very low, this is because for a dictator from the minority group it is easier to buy the violent support of his own group than to bribe all citizens. The minority group can expect less from democratization: the government, formed by the citizens from the majority group in the country, will not channel oil revenues towards them. A dictator from the majority group will never be able to afford the violent support of his own group; the majority group will be well off following a democratization, and the head of state knows that if they choose to suppress the protests this might lead to chaos.

In contrast to earlier work, Hodler (2012) also includes natural resource revenues as an important factor. His findings are consistent with empirical evidence of the anti-democratic properties of oil presented by for example Ross (Ross 2001a, cited in Ross 2002) and Tsui (2011).

In his article Hodler (2012) states that though there most certainly are many country specific factors that may have influenced the dictators' responses, the general pattern across the Arab world can be understood by the interaction of oil revenues and the dictator's affiliation to majority or minority ethnic or religious groups in the country. This can be seen by comparing the predicted outcomes of his model (see table 2) with the observed outcomes. Tunisia and Egypt have little oil revenues and their leaders are affiliated with the majority ethnic group of the country; respectively Ben Ali and Mubarak are both affiliated with Sunni Islam,

and both leaders conceded power as the model predicts. In Libya and Syria the dictators all belonged to the ethnic minority while oil revenues are intermediate in Syria and high in Libya: the model predicts political violence, and unfortunately, this is what we have observed.

Hodler's (2012) paper is purely theoretical with some anecdotal evidence, and in his paper he presents a very stylized model of the Arab Spring showing a very polarized society where we are only looking at two heterogenous ethnic or religious groups. This seems rather unrealistic, though the anecdotal evidence has been good when constricted to the Arab Spring. This stylized and theoretical model will in this thesis be extended to the whole world to see if it can shed light on previous conflicts and political transitions outside the Arab regions. I will start by finding data on world conflicts, ethnic measures and oil variables, creating an interaction term that will encompass the heart of Hodler's (2012) theory; namely oil revenues combined with the leader's affiliation to either the majority or minority ethnic group in his country. I will then empirically test to what extent, if at all, this interaction term affects the outbreak of conflict throughout the world, giving special attention to the Arab regions as this seems paramount to the theory. It will, in and of itself, be interesting to see if the Arab countries react differently when looking at oil revenues and the head of state's affiliation with respect to conflict when compared to the rest of the world, and of course whether this can be used as an explanation for the outbreak of conflict in general. In addition to extending the existing theory to include the whole world, I will also be utilizing different measures for conflict. Not only will I test whether the probability of conflict outbreak will increase when a minority leader is combined with oil wealth, I will also use a measure of military expenditure and see if this is affected by the same variables. As mentioned above, increased military spending can be seen as an increase in the political entry barriers, and it also fits nicely into the theory where the leader of the country may pay people from his own ethnic group to stop possible uprisings.

As mentioned in the section describing previous literature, there are countless research papers concerning conflict and its possible ties to oil wealth, but as Hodler (2012) himself mentions, the focus on leader affiliation is novel. It is therefore very interesting to test whether this can be generalized as an explanation for the outbreak of conflict world wide, or if it can explain oppression and high military spending in countries where oil abundance is combined with a leader affiliated with the ethnic minority.

4 Empirical strategy

This section starts off by explaining how the theory can be tested in an empirical framework, showing which measures will be used to represent the different variables of interest, and explaining the basic equation linking these to the dependent variable, which is represented by both a measure of civil conflict and by military expenditure. A discussion on different measures for the variables and why the particular measures were chosen is given in section 5. Further, the empirical strategies chosen to test the main hypothesis are explained.

4.1 Methodology

The data set used in this thesis has a sample of over 100 countries from all regions of the world over a period from 1929-2008, though when adding the information on the head of state's affiliation to either the minority or majority ethnic group, the time period is restricted to 1945-1999, which still comprises an extensive sample. More details concerning the data set and the variables used will be given in later sections.

Using this data set to test whether Hodler's (2012) theory can be applied to the rest of the world, and whether it is accurate for the Arab region in particular, a basic equation is needed to connect the variables of interest, along with certain control variables, to a measure of conflict.

$$conflict_{it} = \beta_0 + \beta_1 oil_{it} + \beta_2 la_{it} + \beta_3 oil_{it} \cdot la_{it} + \beta_4 x'_{it} + \epsilon_{it} \tag{1}$$

This is the general equation that will be used throughout the estimations. The dependent variable will be represented in the main framework by two different measures, calling for different estimation methods to be utilized, this will be described bellow in detail. The panel indicators are as follows; t representing the year in the data and i indicating the country. β_0 is the intercept. The variable *oil* denotes oil wealth and is in this thesis measured by oil reserves which is used as a proxy variable for oil wealth. To get consistent estimators when using a proxy variable it is required that the error term is uncorrelated with both the original variable, in this case oil wealth, and its proxy, here oil reserves. If $oilres = \delta_0 + \delta_1 oilwealth + v_1$ then the error term, v_1, must be uncorrelated with oil wealth to ensure that oil reserves is a good proxy for oil wealth in this very simple framework (for more on proxy variables see Wooldridge [2009]).

The variable named la represents leader affiliation, which is a dummy variable. This variable is represented by three different measures depending on the definition of different ethnic groups, this will be discussed in more detail below. The main variable of interest is the interaction term between the two aforementioned variables, denoted as $oil \cdot la$. Interacting a dummy variable with another (non-binary variable) allows for a difference in slope (Wooldridge 2009).

The parameter β_1 measures the effect of oil abundance when $la = 0$, that is: it measures the effect of oil abundance on the $conflict$-variable in all countries that are not controlled by a leader affiliated with the ethnic minority, ceteris paribus. When the country is controlled by a minority leader, that is; when $la = 1$, then the aggregate effect of oil wealth on the measure of conflict is given by $\beta_1 + \beta_3$. To show this specifically, equation (1) can be written as:

$$conflict_{it} = (\beta_0 + \beta_2 la_{it}) + (\beta_1 + \beta_3 la_{it}) oil_{it} + \beta_4 x'_{it} + \epsilon_{it} \tag{2}$$

From this equation it is clear that β_3 measures the difference in oil wealth on either the onset of civil war, or on the difference in military expenditure, between a country with a head of state belonging to the ethnic minority and a county that does not have leader from the ethnic minority. Put more simply; the difference in the effect of oil on $conflict$ when $la = 0$ and when $la = 1$. This is the coefficient of interest in the base line equation. Though when interpreting the effects of the interaction term on the dependent variable, β_1 might also affect the results, which is clear from equation (2).

The leader affiliation coefficient, β_2, is the effect of the leaders affiliation with the minority ethnic group when the country has no oil abundance, in my empirical model that is; oil reserves are equal to zero. This does not happen very often in the data, which may affect this coefficient.

The control variables are represented by x', a vector which includes, but is not limited to population, per capita GDP, democracy and rough terrain. See below for a complete list of the control variables and reasons for their inclusion. Lastly; ϵ_{it} is the error term, capturing all other omitted factors that can affect the dependent variable, with $E(\epsilon_{it}) = 0$ for all i and t.

The sign of our main variable of interest, the interaction term between oil wealth and

leader affiliation, is expected to be positive for both measures of conflict according to the theory. With $\beta_3 > 0$ increased oil wealth in a country where the head of state belongs to the ethnic minority will increase the probability of conflict, or in the case military expenditure; the defense burden will rise, as the head of state spends more on military to fight the oppression. An important hypothesis is that the effect of oil on the onset of civil conflict or defense burden is the same for when a country is controlled by a leader affiliated with the ethnic minority and when it is not.

The sign of β_1 is somewhat ambiguous, depending on which economic theory you trust. According to the wide literature concerning the resource curse, oil wealth will cause growth to stagnate and lead to conflict and instability, giving this variable a positive sign, though many have disputed this in later years. As for the sign of β_2 this is also ambiguous at the start of the empirical testing. According to Fearon, Kasara, and Laitin (2007) scholars have long suggested that having a head of state belonging to the country's ethnic minority will lead to a higher probability of conflict, though they themselves find that countries controlled by a leader from the minority ethnic group show no increased probability of conflict. It must also be remembered that this coefficient may be affected by the fact that oil reserves are very rarely equal to zero as explained above. Section 5 will give a more thorough discussion of these last two variables, and what measures have been utilized in this thesis to deal with some of the ambiguity. The expected signs for the control variables will also be explained there. For a summary table of the variables described below and those used for sensitivity analysis, see appendix A.1.

4.2 Estimation Using the Onset of Civil War

In this estimation framework the dependent variable will be represented by $Fearon\_war$ which is a dummy variable equalling one if war and zero otherwise. When describing qualitative information, the difference can be seen as an intercept switch. The group which has had no civil war, the dependent variable here equalling zero, is the benchmark group against which we compare others. The other variables in the equation are represented by the measures described above. Because the equation now encompasses a binary dependent variable the parameters measure the change in the probability of $Fearon\_war$ equalling one when one of the explanatory variables changes, ceteris paribus. Equation 3 shows the base line equation in this estimation framework.

$$Fearon\_war_{it} = \beta_0 + \beta_1 oil_{it} + \beta_2 la_{it} + \beta_3 oil_{it} \cdot la_{it} + \beta_4 x'_{it} + \epsilon_{it} \tag{3}$$

When the dependent variable is binary, the error term has a non-normal distribution, and suffers from heteroskedasticity. There are several estimation methods we can use to cope with the dependent binary variable. One of these is the linear probability model, here the response probabilities are linear in the parameters, β_j, but this model does not restrict predictions to lie between zero and one. Another shortcoming of this model is that the partial effect of any explanatory variable (level) is constant. Therefore the probit or logit models are more often used. The logit model will be used here and will be described shortly below (for a more detailed explanation of the linear probability model and the logit model see Wooldridge [2009]).

The response probability, that is the probability of the outbreak of civil war, are represent by $P(Fearon\_war = 1|\mathbf{x})$, where $\mathbf{x}$ represents all the explanatory variables. To ensure that the response probabilities lie between zero and one, it can be assumed that $P(Fearon\_war = 1|\mathbf{x}) = \mathbf{G}(\beta_\mathbf{0} + \mathbf{x}\beta')$, where the function G is limited to take on values only between zero and one for all real numbers, z. Further, β' represents all the parameters except the intercept. In the logit model, described by (4), G is the logistic function, which is globally concave:

$$G(z) = \frac{\exp(z)}{1 + \exp(z)} = \Lambda(z) \tag{4}$$

$$0 < G(z) < 1$$

In the logistic standard distribution the variance will be $\frac{\pi^2}{3}$ and the expectation is zero.

Because of the non-linearity of the logit model, OLS is not applicable as it would have been in the linear probability model. Instead the maximum likelihood estimation method is used. This method is based on the distribution of the dependent variable given the explanatory ones, utilizing this estimation method automatically controls for the heteroskedasticity in $var(Fearon\_war|\mathbf{x})$ (Verbeek 2012).

When $Fearon\_war$ is the dependent variable, the logit model is used to estimate whether an increase in one of the explanatory variables will increase or decrease the likelihood that there is a civil war, i.e. that $Fearon\_war = 1$.

4.3 Estimation Using Military Spending

$$MilitaryExpenditure_{it} = \beta_0 + \beta_1 oil_{it} + \beta_2 la_{it} + \beta_3 oil_{it} \cdot la_{it} + \beta_4 x'_{it} + \epsilon_{it} \quad (5)$$

The dependent variable in the above equation will here be represented by military expenditure, allowing me to test whether the countries with oil wealth and a minority leader leads to more military spending to discourage riots and conflict. Regressions will be performed with both pooled OLS and fixed effects. Using the pooled OLS method allows for comparison with previous findings, and can be seen as a benchmark model of sorts. The fixed effects estimation is useful for removing the influence of long-run determinants of both the oil variable and the conflict variable, but it does not necessarily give a causal relationship.

As Cotet and Tsui (2013) mention, existing studies on the subject of oil and conflict using pooled OLS establish a causal relationship but do not typically control for factors that may affect both variables simultaneously. For example; unfavorable institutions may affect the probability of civil war outbreak and also reduce the rate at which oil is being extracted, endogeneity and omitted variable problems such as this tend to bias the OLS estimator, for conflict there is downward bias, but for the oil variable there is evidence from the theory of the tragedy of the commons that countries with incomplete property rights will over-use their resources, therefore creating an upward bias.

Fixed effects and pooled OLS are both panel data models which means that the error term is assumed to consist of two parts. Wooldridge (2009) explains that the idiosyncratic error term, u_{it}, is assumed to be uncorrelated over time, whereas α_i is assumed to be time invariant and homoskedastic. The error term is therefore $\epsilon_{it} = u_{it} + \alpha_i$. The standard errors can be adjusted to account for possible heteroskedasticity and autocorrelation, creating cluster-robust estimates. Throughout this thesis robust standard errors clustered at the country level are reported, allowing the standard errors to be heteroskedastic and correlated within country over time.

In panel data models it is assumed that the explanatory variables are exogenous; $E(x_{it}\epsilon_{it}) = 0$, though there may be reason to believe that $E(x_{it}\alpha_i) \neq 0$, which obviously constitutes a problem. In fixed effects this is dealt with by including individual specific intercept terms, α_i, called the fixed individual effects, which captures all (un)observable time-invariant differences across i (Verbeek 2012). Estimating the model while using fixed effects will eliminate the fixed individual effects from the error term, by doing this the endogeneity problems

relating to this term are also eliminated. As is explained by Wooldridge (2009) the fixed effects estimator allows for arbitrary correlation between α_i and the explanatory variables in any time period. Any explanatory variable that does not vary over time is simply eliminated from the sample together with the time-invariant error term. The elimination is done by performing the regression in deviations from the individual means, also called "the within transformation". Where the fixed effect method focuses on explaining differences "within" countries (individuals), the pooled OLS method uses both within and between variation, but not efficiently (for a more detailed discussion on panel data models see Wooldridge [2009]) .

The idea of fixed effects is to use the within-country variation. The validity of the fixed effect strategy used in Cotet and Tsui (2013) depends on the quality and quantity of the data, because fixed effects may intensify measurement error by throwing away much of the variation in the explanatory variables. Beck and Katz (2001) argue that using the fixed effects estimation method can be quite harmful given that the dependent variable is binary, and further argue that it may also be harmful even when the dependent variable is continuous, especially when temporarily stable regressors, such as democracy, are present. Generally, in the binary case, the harmfulness of using fixed effects will be that many countries are given a zero score, and hence have no impact on the parameter estimation. In the specific case of this thesis, using fixed effects on a model where a dummy variable for conflict is the dependent variable makes no sense, as you then throw away information on all the countries in peace. This is the reason I have chosen to use a logit estimation method when dealing with the model where a binary dependent variable is used.

Cotet and Tsui (2013) defend their use of fixed effects in this case with the use of their unique and extensive data set. As mentioned above, the peak of oil discovery for most countries was in the 1960's, and because this data set covers a time from 1929 (or in my case, when including the information on minority leaders, 1945), the data allows the examination of many countries from the time before their first oil discovery. Therefore, as is crucial for the fixed effects estimation, the data set gives a significant within-country variation on oil wealth. In addition, fixed effects estimation, though it has flaws, provide a useful benchmark estimation that makes it possible to compare the results with previous findings.

5 Data

This section will describe the different measures that have been chosen to represent the variables in the baseline equation, (1). The data set used to test the theory of whether oil wealth combined with a head of state from the country's minority ethnic group raises the probability of conflict is taken mostly from Cotet and Tsui (2013), though the variable for leader affiliation is from Fearon, Kasara, and Laitin (2007) and the dummy variable indicating countries from the Arab regions was made using information from EIA (2013).

5.1 Defining Conflict, Civil War and Military Expenditure

This thesis is based on the theory in Hodler (2012), but the empirical segment has been inspired in part by Cotet and Tsui (2013). In this subsection I will be explaining how the conflict variables are defined, and also looking into how the data has been compiled on the subject, as I will use this data in my later regressions. Cotet and Tsui (2013) have a very elaborate and detailed data set encompassing several different variables for measuring civil war, oil and ethnic diversity. For civil war they use data taken from Gleditsch's (2004) revision of the COW data set, and the dummy variable taken from Fearon and Laitin (2003) amongst others. In my regressions I will focus on the Fearon and Laitin (2003) dummy, which is coded as 1 if there is a civil war and 0 otherwise. The years in which a civil war continues are not coded as one, as it is the onset, not the duration of civil war that is of interest, however; a lagged dependent variable is included as a control variable, this is further discussed below. Fearon and Laitin (2003) construct a list of violent conflicts that meet the following criteria; firstly, the fighting must be between a state and organized non-state groups wanting to take control of the government, the region or using violence to change policies. Secondly; at least 1000 are killed over the course of the civil war, with a yearly average of at least 100. And lastly; at least 100 must be killed on both sides.

As mentioned earlier the arbitrary threshold of 1000 deaths has long been criticized, Cotet and Tsui (2013) try to remedy this by looking at other measures of political violence; military coups attempts, irregular leader transitions and an increase in the defense burden. The defense burden is measured as military spending as a fraction of GDP and the data for this variable is collected from SIPRI; Stockholm International Peace Research Institute. SIPRI, which was established in 1966, does research into the areas of conflict, arms control and disarmament (SIPRI 2013). Though all the aforementioned alternative variables are

very useful, my main focus will be on the defense burden. This is because not all conflict may lead to an attempt to challenge the state, the fighting may be deterred by the military, making the defense burden an indicator of political entry barriers. As mentioned by Collier and Hoeffler (2004); if the natural resources are very abundant, as in for example Saudi Arabia, the government may be so well financed that rebellion is military infeasible. This fits nicely into Hodler's (2012) theory about the Arab Spring, where the country's leader uses oil revenues to pay his own ethnic group to fight down the majority, or in the case of Saudi Arabia, the king giving 36 million USD in benefits to the Saudi people presumably to deter protests (Hodler 2012).

For my dependent variable I will therefore focus on two measures of conflict; a dummy variable for the onset of civil war and a continuous variable measuring military spending. As discussed in detail above these two measurements prompt the use different estimation methods. For the war dummy I will be using logit, as this creates a model with a binary dependent variable, for military spending pooled OLS and fixed effects will be used.

5.2 Measuring Ethnic Diversity

As mentioned in the section regarding previous literature the two variables I will be utilizing to measure ethnic diversity is the measure for polarization based on Montalvo and Reynal-Querol (2005) as a main explanatory variable, and the ELF-index based on Alesina et al.'s (2003) research as a robustness check. In this subsection I will discuss these measures and show the differences between them as these measures will both be used as control variables in the empirical results of this thesis.

The measure for polarization was originally proposed by Reynal-Querol (Reynal-Querol 2002, cited in Montalvo and Reynal-Querol 2005). Equation (6) (Montalvo and Reynal-Querol 2005) summarizes the measure for ethnic polarization.

$$RQ = 1 - \sum_{i=1}^{N} \left(\frac{1/2 - \pi_i}{1/2} \right)^2 \pi_i = 4 \cdot \sum_{i=1}^{N} \pi_i^2 (1 - \pi_i) \tag{6}$$

Where π_i is the proportion of people who belong to an ethnic group, i. N is the total number of groups.

The alternative measure for ethnic diversity, the ELF-index from Alesina et al. (2003), reflects the probability that two random people from a population belong to different groups. The index is summarized by the equation (7) (Montalvo and Reynal-Querol 2005).

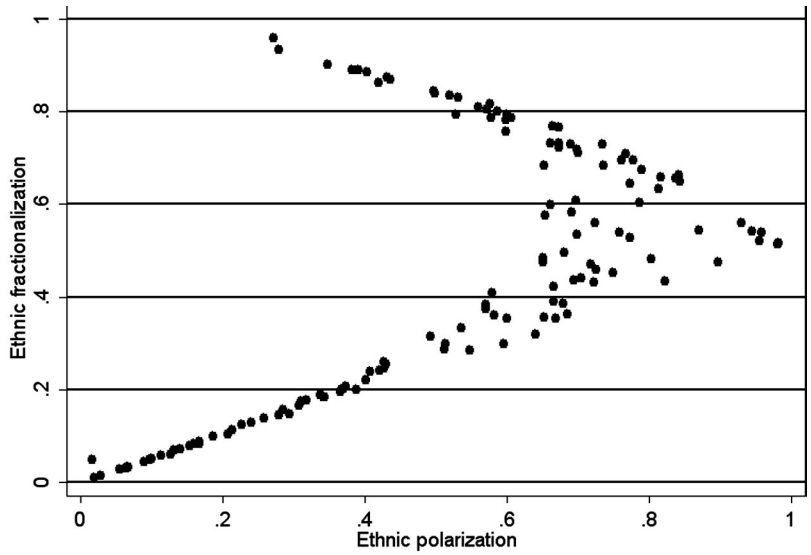
$$FRAC = 1 - \sum_{i=1}^{N} \pi_i^2 = \sum_{i=1}^{N} \pi_i(1 - \pi_i) \tag{7}$$

Where, again, π_i is the proportion of people who belong to an ethnic group, i. N is the total number of groups.

With the fractionalization index given by (7), the size of the group has no effect on the weight of the probability that two people belong to different groups. With the RQ-index, on the other hand, these measures are weighted by the relative size of each group. In short; large groups contribute to the RQ-index proportionally more than their relative size, but proportionally less than their relative size in the FRAC-index (vv for small groups). The difference between fractionalization and polarization is both theoretical and actual, as shown above.

From figure 1 below it is clear that for low levels of fractionalization the correlation between fractionalization and polarization is positive and high, with a high level of polarization the correlation becomes negative, whereas for medium levels there is no correlation at all.

Figure 1: Ethnic polarization and fractionalization



Montalvo and Reynald-Querol (2005, 802)

Both ethnic fractionalization and polarization should in theory be associated with a higher risk of civil war. Neither Cotet and Tsui (2013) nor Fearon and Laitin (2003) find these variables to be significant. Following the popular beliefs, I assume to find that these measures will affect conflict positively, though I give more stock to the measure of polarization as I feel this encompasses the theory behind this thesis more clearly than fractionalization. The RQ-measure is at its maximum when a large minority faces a majority, drawing the basis needed for a minority leader to engage his ethnic group in oppressing or fighting the majority.

5.2.1 Minority Leaders

As mentioned above, an important explanatory variable is the head of state's affiliation with either the majority or minority ethnic group in the country. The data that has been collected on this subject was taken from Fearon, Kasara, and Laitin (2007) where they use Goemans et al.'s list of heads of state combined with the ethnic categories explained in Fearon (2003), they collect observations for 161 countries over the period 1945-1999, though this does not cover the entire time period of the data set already in place, this is an excellent measure of leader affiliation (Goeman et al. 2005, cited in Fearon, Kasara, and Laitin 2007).

The ethnicity of the country's leader in Fearon, Kasara, and Laitin (2007) is represented by three alternative measures. Minority leader 1 codes "white" leaders as different from "mestizo" leaders. In minority leader 2, these ethnic groups are coded as the same, and in minority leader 3 some minority leaders in Canada, Belgium, Switzerland, Czechoslovakia, Yugoslavia, and the USSR are recoded as leaders from the majority ethnic groups (Fearon, Kasara, and Laitin 2007). In this thesis all three measures will be used in the estimation as a robustness check, though my main focus is on minority leader 1.

The sign of the coefficient corresponding to the dummy variable indicating if the country is controlled by a leader belonging to the ethnic minority is expected to be positive. Cederman and Girardin (2007) find that their measure for a minority leader, the N^*-index, has a positive and significant effect on the outbreak of civil war. Fearon, Kasara, and Laitin (2007) also find, using the measure also applied in this thesis, that a country with a head of state connected to the country's minority has a marginally higher probability of civil war, though they note that the association is weak and uncertain. As I am using their dummy variable as a measure of the leaders ethnic affiliation, I expect my results to be similar to theirs.

5.3 Oil Reserves

As mentioned earlier, my data set and empirical approach is based on Cotet and Tsui (2013). In their article a long panel of oil abundance from the 1920's to the early 2000's is constructed based on the industrial data. The data has been obtained from Dr. Colin Cambell at the Association for the Study of Peak Oil (ASPO), to study the impacts of the peak of world oil discovery which took place in the 1960's, and the decline thereafter. In their unique panel data set which describes world wide oil discoveries and extractions, exploration, and endowments, they find that the rate of extraction is endogenous, which is troubling because this might cause bias in any direction when applying simple estimation methods to the data. Unfavorable institutions may reduce the extraction rates and may in addition increase the chances of civil war, this will lead to downward bias. There is also a problem of reverse causality as armed conflict could directly damage oil production. On the other hand: the heads of state in a politically unstable country may over-extract relative to the efficient extraction rate because of insecurities about the future, causing upward bias. Cotet and Tsui (2013) argue that oil reserves are a better measure of oil abundance, as this measure is less likely to be affected by this endogeneity bias.

ASPO gives an advantage over other data sources, such as the BP Statistical Review of World Energy or the Oil and Gas Journal (OGJ), because it contains information on both discoveries and production. Oil reserves are computed by subtracting cumulative production from cumulative discovery. This is necessary because countries have an incentive to mis-report their reserves due to the OPEC quota being based on the member's production capacity. For example; according to BP Kuwait reported a 50% increase in the country's reserve in 1984 (Cotet and Tsui 2013). Instead of relying on the self-reported reserves, the ASPO data set removes any suspicious drastic changes in oil reserves or implausible unchanged reserves.

In following Cotet and Tsui (2013) I will be using oil reserves as a measure of a country's oil abundance. In earlier work, production has been used as a proxy for oil wealth but it is argued that oil production contains measurement error, leading to a biased and inconsistent estimator. It is further argued that oil reserves are less likely to be affected by endogeneity bias, providing a better proxy for oil wealth than oil production, because the production profile of each oil field follows the pattern of an inverted U-shape over time. The inverted U-shape is caused by geological constraints when extracting or finding oil. I will, however

be using oil production as an alternative measure for abundance in the sensitivity analysis. Cotet and Tsui (2013) argue that a case where a leader only cares about oil rent in the present, deeming oil rent in the future as irrelevant, will be better captured by using oil production as a proxy for oil rent, therefore using this measure as a robustness check in their paper.

Another interesting feature of the article by Cotet and Tsui (2013) is that it includes data on the number of wildcats drilled, a wildcat being the first exploratory hole. Cotet and Tsui (2013) utilize the randomness of success and failure of such wildcats to address endogeneity problems and measurement errors. Though this is beyond the scope of this thesis, it may be an interesting extension.

The variable *oil* from the base line equation is therefore denoted as "logvaloilres" in the data set, and is defined as the log of oil reserves per capita/100, replacing any zeroes in the data with minimum positive values of oil reserves per capita in million barrels per 1000 persons. Using the log form of a variable usually narrows the range of the variable and therefore makes it less prone to be affected by extreme observations (Wooldridge 2009).

Popular beliefs dictate that this variable should have a positive estimated parameter, β_1 in (1), meaning that more oil wealth will cause increased probability of civil war, ceteris paribus. Fearon and Laitin (2003) both argue for and find that oil producers tend to have a higher probability of civil war. The revenues collected from oil abundance causes a lesser need for elaborate bureaucratic systems to raise revenues, a so called "political Dutch disease". In addition, oil revenues will increase the prize for which the rebels compete, giving more incentive for civil war. Though Cotet and Tsui (2013) find no evidence of oil abundance leading to a higher probability of civil war, I will expect the sign of β_1 to be positive for both the onset of civil war and, as is supported by Cotet and Tsui (2013), for military spending.

5.4 Control Variables

I will mainly be following Fearon and Laitin (2003) when dealing with the control variables used in my data set, in addition to following Cotet and Tsui (2013). In this section I will be describing the control variables included in my main regression analysis and discuss their expected signs. For a detailed description of the measurement and scale of the following variables I refer to my code book, see appendix A3.

A high percentage of oil producing countries are located in the Middle East, and Huntington has argued that muslim countries are more violent-prone (Huntington 1996, cited in Fearon and Laitin 2003). Both of these characteristics are prominent in the countries affected by the Arab Spring and should be controlled for to determine whether or not these variables are important when looking at the risk of civil war onset.

For this reason special focus will be given to the so-called MENA region; Middle East and North Africa, as it is prominent in the theory given by Hodler (2012). This region includes both the oil-rich countries around the Persian Gulf in addition to resource poor countries such as Egypt and Yemen. The region contains 6% of the world's population and 60% of the world's oil reserves, and many of the 12 OPEC countries are found here. This makes the MENA region an important source of global economic stability (for more on the MENA region see Investopedia [2013]). The World Bank (2013) claims that the reason the region has seen such good economic fortune in recent time is the high price of oil combined with the legacy of economic structures that has emphasized a leading role for the state. The region has no standard definition, but generally the area encompasses Morocco in northwest Africa to Iran in southwest Asia and south to Sudan in Africa. To find whether this region has any specific characteristics that make oil wealth combined with a minority leader result in conflict or increased military spending more often than in countries not in the MENA region, I will include a dummy variable for the MENA countries in my model. A map of the MENA region can be seen below, for a full list of the countries included in the MENA dummy variable see appendix A2.

The sign of the MENA dummy variable may be difficult to anticipate. Some have stated that muslim countries are more prone to violence, Huntington argues that "Islam has bloody borders" and "bloody innards" (Huntington 1996, cited in Fearon and Laitin 2003). As the population in the MENA region consists of 93% muslims (Desilver 2013), one might expect, though this is not my personal belief, that for this reason the MENA dummy should have a positive effect on conflict[3]. In any case, it will be interesting to see if the lone effect of MENA has any significant effect on conflict or military spending.

[3]On the other hand; 62% of the worlds muslims live in Asia-Pacific and the MENA region only accounts for approximately 20% of the worlds muslim population as a whole (Desilver 2013)

Figure 2: Map of MENA region

From U.S. Energy Information Administration (EIA 2013)

Also included as control variables are other regional dummies for some parts of the world which may be of particular interest. In addition to the dummy indicating MENA, a dummy for Asia, Sub-Saharan Africa and Latin America are included. These regions will be studied separately, though special care should be taken when reviewing the results from these specifications as these subsamples include few observations.

Fearon and Laitin (2003) argue that a large population favors insurgency. With a large population it is harder for the head of state, or the government in general, to keep track of possible militant groups, in addition it increases the number of potential recruits needed for a rebellion. As previous literature has found, the expected sign for this control variable is positive, meaning that increased population is expected to increase the probability of civil war or military expenditure.

GDP per capita can be seen as a proxy for the overall financial, administrative and policing capabilities of the country. In addition, it marks a country as more developed as a higher income per capita may have better roads and rural societies that are more affected by the central government, so for higher per capita income, the risk of civil war is assumed to decline.

As a standard control to most research in conflict literature in recent years, rough terrain is expected to increase the chances of civil war and military spending. Mountainous terrain is used as a proxy for rough terrain, and though this does not encompass for example swamps or jungle which can also be used to hide rebel groups, it is the best measure that has been found for this variable, and it seems to be working quite well.

The measure for democracy should be associated with a lower risk of civil war and lower military spending. Though Fearon and Laitin (2003) find that after controlling for income, civil wars are no less likely in democracies. They argue that given the right environmental conditions, insurgency is possible even with a small number of rebels that do not have widespread popular support that often come with grievances. Insurgency is therefore possible even in democracies. On the other hand, it is argued in Cotet and Tsui (2013) that oil does not affect conflict or military spending in democracies as these have better institutions to restrain the heads of state.

In addition to these control variables I will also add a lagged dependent variable as control. Adding a lagged dependent variable is an easy way of accounting for historical events that may affect the dependent variable today and that are difficult to account for in other ways. Conflict specifically, and also military spending, may have inertia so the expected effect of these lagged dependent variables are obviously positive. This method of controlling for unobserved variables is not perfect, but it improves the estimates markedly (Wooldridge 2009).

6 Main Results

In this section I will present and describe my main findings using both the onset of civil war and military spending as the dependent variable. The major task of this thesis is firstly to find out how, if at all, conflict is affected by a leader affiliated with the country's minority group combined with oil wealth, secondly to see if the same combination of variables affect military spending.

The results I present in this section are divided into four tables, the first two concentrating on the main results. Firstly, when the dependent variable is the dummy variable for civil war onset from Fearon and Laitin (2003) and the method of estimation is logit and secondly the results for the military expenditure dependent variable using fixed effects and pooled OLS is presented. The last two tables presented here show the estimated results for the regional specifications (not including MENA which will be presented in the first two tables) for both of the dependent variables. The explanatory variables are as described in detail above. For oil abundance the measure of oil reserves is used as a proxy, whereas the measure for leader affiliation is minority leader 1, coding "white" leaders as different from "mestizo" leaders. The measure for ethnic diversity is ethnic polarization from Montalvo and Reynal-Querol (2005).

Table 3 gives the estimated results based on (3) when the explanatory variables are as explained above and the dependent variable is represented by the dummy variable for the onset of civil war, equaling one for all country-years in which a civil war started and zero for all others. Column (1) in the table gives the estimated results for the whole sample, whereas column (2) gives the estimated coefficients when the sample is restricted to the MENA-region. It is important to note that when the sample is restricted to the MENA countries, the number of observations is drastically reduced, leaving a very small sample. As can be seen from the tables on the following pages, the standard errors become very large when the sample is reduced to a regional specification.

Table 3: Main Results: Civil War Onset

	ALL LOG	MENA LOG
	(1)	(2)
L.Fearon_war[a]	6.144***	4.494***
	(0.231)	(0.598)
Oil reserves (log)[a]	-0.407	43.740
	(1.879)	(40.530)
Minority leader 1[a]	0.683**	4.462*
	(0.327)	(2.399)
Oil and leader affiliation[a]	0.803	-6.645
	(2.346)	(40.410)
MENA	-0.219	
	(0.469)	
GDP (log)[a]	-42.72***	-5.712
	(15.770)	(63.280)
Population (log)[a]	32.40***	67.57*
	(11.080)	(37.660)
Democracy[a]	43.960	190.100
	(47.730)	(128.80)
Mountain	-0.003	0.101**
	(0.005)	(0.05)
Ethnic polarization	0.476	-0.971
	(0.57)	(2.311)
Asia	0.215	
	(0.372)	
Sub-Saharan Africa	-0.082	
	(0.353)	
Latin America	-0.294	
	(0.337)	
Constant	-4.326**	-14.69*
	(1.710)	(7.53)
Observations	4062	482
Correctly classified	97.34%	97.30%

Significance at the 1, 5, and 10 percentage levels are indicated by ***, ** and *, respectively.
Robust standard errors given in parenthesis
[a] Lagged one year

In column (1) of table 3 regional dummies for Asia, Sub-Saharan Africa, and Latin America have been included when looking at the whole sample, this is continued in all estimations using the entire sample throughout the thesis. Interpreting the coefficients when logit is used requires some care. Only the signs of the coefficients can be interpreted, not the magnitude because different models have different scales of coefficients (Wooldridge 2009). Looking at the coefficient of the lagged dependent variable, called L.Fearon_war, it is clear that it is positive and significant; if there was a civil war the previous year, the likelihood that there is a civil war in the present year increases. In other words, the outcome of a civil war this year is more likely if there was a civil war the previous year. This is intuitive as the country will be destabilized by the civil war.

The effect of oil reserves on the probability of the onset of civil war differs in the columns, though neither is statistically significant. As mentioned, the expectations surrounding this effect might be somewhat ambiguous, as results have been provided either way. The result in column (2) does, however, support my expectations that increased oil reserves increases the likelihood of civil war, as the coefficient is positive. Remembering that the sample containing the MENA countries is very small, this result should be interpreted with caution. In column (1) the coefficient is negative, but it is not statistically significant. To find the aggregated effect of oil reserves in a country where the leader belongs to the ethnic minority, the coefficients for oil reserves must be combined with the coefficient linked to the interaction term between oil and leader affiliation, as was explained above. In doing this, it becomes clear that both when using the complete sample and when restricting the sample to the MENA region, the aggregate effect of oil in a minority-led country is positive, though not significant[4].

The coefficient corresponding to the dummy variable indicting if the country has a leader from the ethnic minority is statistically significant and also positive both for the whole sample and for the MENA subsample. This indicates, as is suggested by the theory and previous empirical research (Fearon, Kasara, and Laitin 2007 and Cerderman and Girardin 2007), that having a minority leader will increase the likelihood of the country experiencing civil war.

[4]The aggregate effect for oil in a country where the head of state is affiliated with the ethnic minority is, from equation (3), $\beta_1 + \beta_3$ which here is: $-0.407 + 0.803 = 0.396$, a similar calculation can be done for the MENA specification.

Table 4: Main Results: Military Spending

	ALL POLS	MENA POLS	ALL FE	MENA FE
	(1)	(2)	(3)	(4)
L.military expenditure[a]	0.380***	0.208***	0.188***	0.164***
	(0.139)	(0.024)	(0.028)	(0.038)
Oil reserves (log)[a]	3.038	222.8***	59.290	290.100
	(2.341)	(32.100)	(39.760)	(275.500)
Minority leader 1[a]	-0.315	7.435***	-0.073	
	(0.451)	(1.483)	(0.133)	
Oil and leader affiliation[a]	-3.015	-165.2***	-0.808	93.080
	(3.102)	(21.850)	(1.656)	(222.300)
MENA	0.944			
	(0.844)			
GDP (log)[a]	11.960	-367.4**	-211.700	-918.4**
	(14.490)	(145.70)	(143.600)	(368.700)
Population (log)[a]	-21.770	-39.230	133.20	776.600
	(15.220)	(36.960)	(250.20)	(1199.000)
Democracy[a]	-131.1**	202.200	-99.240	-8.803
	(61.660)	(306.500)	(66.820)	(793.200)
Mountain	0.0045	-0.0965**		
	(0.005)	(0.030)		
Ethnic polarization	0.00023	-7.246***		
	(0.720)	(1.832)		
Asia	0.846*			
	(0.490)			
Sub-Saharan Africa	-0.388			
	(0.417)			
Latin America	-0.215			
	(0.317)			
Constant	3.602*	35.38**	12.480	3.656
	(1.964)	(12.720)	(10.890)	(95.320)
Observations	895	105	895	116
Number of clusters (numcode)			83	10
R-squared	0.579	0.867	0.187	0.256

Significance at the 1, 5, and 10 percentage levels are indicated by ***, ** and *, respectively.
Robust standard errors given in parenthesis
[a] Lagged one year

The main explanatory variable of interest, the interaction term between oil reserves and a minority leader is not statistically significant in either specification of the model, and has opposite signs in the two columns. The sign is expected to be positive according to the theory, but for the MENA subsample the coefficient is negative meaning that oil wealth combined with a head of state from the country's ethnic minority actually lowers the likelihood of civil war outbreak.

The regional specifications in column (1) in table 3 are all statistically insignificant and negative except for Asia which is positive. The rest of the control variables, such as GDP per capita and population are as expected. The sign of the coefficient connected to GDP per capita is negative, suggesting that increased income gives a lower probability of civil war, and for population it is positive, coinciding with the theory on insurgency: a higher population gives a higher probability of civil war. These variables are only significant when the whole sample is used. Democracy is positive for both specifications, though not significant. Mountainous terrain is only significant when the sample is reduced to the MENA region and only here has the expected positive sign. The measure for ethnic diversity is not significant in either column.

For the most interesting explanatory variables I have calculated the marginal effects, these values reflect the change in the probability of a civil war outbreak ($Fearon\_war = 1$) given a one unit change in the the explanatory variable of interest. For column (1) in table 3 the marginal effect of oil in a country not led by a minority leader is -0.015. This means that a one percent change in oil reserves decreases the probability of civil war by 1.5 percentage points. The marginal effect of aggregate oil reserves on the probability of conflict when the country is led by a leader from the minority ethnic group is calculated to 0.0144. This effect is positive meaning that in a minority led country, a one percent increase in oil reserves will lead to a 1.4 percentage points increase in the probability of civil war [5]. The marginal effects when the sample has been restricted to the MENA region were calculated to be positive and larger for the aforementioned effects. For oil reserves in a country not led by the ethnic minority the effect was 0.14 and for the marginal effect of oil reserves in a minority led country the effect is smaller though still positive at 0.119. This contradicts what the theory predicts.

[5]Marginal effects were calculated in stata using the command mfx. The marginal effect for the leader affiliation coefficient was 0.803. This coefficient must be interpreted with care as mentioned because it may be affected by the fact that oil reserves are rarely equal to zero in the sample.

In Table 4 the results are given when the dependent variable is military expenditure per GDP, the explanatory variables are the same as above. Here columns (1) and (3) represents the results for the whole sample using pooled OLS and fixed effects respectively. Column (2) and (4) are restricted to the countries in the MENA region using pooled OLS and fixed effects, again the subsample becomes very small with this specification.

In column (1) of table 4 the whole sample has been used to find the effect of the explanatory variables on military spending by pooled OLS. Only military spending the previous year, denoted as L.military expenditure, and democracy are statistically significant in this estimation. Democracy has the expected negative sign, the intuition being that with a higher scoring on the Polity IV democracy index the country encompasses more or better institutions which may restrain the head of state. Oil reserves and the MENA-indicator are positive, as is expected, though neither are significant. The rest of the regional dummies have the same signs as in logistic specification of table 3. The indicator for leader affiliation and the interaction term between oil and leader affiliation are negative, which goes against what is suggested by the theory.

Column (2) shows the coefficients estimated using pooled OLS when the sample has been restricted to the MENA region. Here all the main explanatory variables are highly significant, and have the expected signs except for the interaction term which has a negative coefficient. A leader associated with the ethnic minority in an oil abundant country in the MENA region leads to a smaller defense burden, this is completely the opposite of what the theory predicts. None of the remaining control variables in this model specification has the expected sign, but we must keep in mind that when restricting the sample to contain only MENA countries, the sample is reduced to only 105 observations. This few observations give little credibility to the results produced.

As mentioned above, the time invariant variables are removed when using fixed effects, therefore none of the regional dummies are reported, along with mountains and the index for ethnic polarization. In column (4) which only uses the MENA sample, the minority leader dummy variable has been left out as there was not enough variation in minority leaders over time in this subsample. In these last two specifications only the lagged dependent variable was statistically significant and the interaction term only has the expected positive sign in the last column, where only the MENA subsample is used.

The aggregate effect of oil reserves on military spending in a country with a leader from the ethnic minority is positive, though insignificant for all model specifications in table 4. In column (4) where fixed effects has been used on the MENA subsample the effect of oil reserves on military spending are larger when the country is led by an ethnic minority leader than when it is not, which is what we would expect according to the theory. In the remaining columns of table 4, the effect of oil becomes smaller if the country's head of state is affiliated with the minority group.

As mentioned above, the effect of the MENA variable was ambiguous as some scholars believe that this region may be affected by the possibly more violent history of islamist countries. From the results presented in tables 3 and 4 it can be seen that the coefficient corresponding to the MENA dummy variable is not significant in any of the specifications. Interestingly though, from column (1) table 3, MENA countries seem to have a lower probability of civil war, but higher military expenditure (see table 4, column [1]).

The last tables presented in this section show regional specifications both when the dependent variable is the onset of civil war, table 5, and when military expenditure is the dependent variable, table 6. Looking at the estimated results of oil wealth on the onset of civil war in countries not controlled by a minority leader from table 5, it is positive for Asia and Latin America, as is expected, but not statistically significant. The coefficients corresponding to minority leader are all positive, but again not statistically significant. The main variable of interest is positive for Asia and Sub-Saharan Africa and is significant at the 5- and 10%-level, respectively. This indicates that in these two regions the combination of oil abundance and a leader affiliated with the minority group leads to increased probability of conflict. It is interesting to note that the aggregate effect of oil in minority led countries in Sub-Saharan Africa is positive, whereas the same effect for countries *not* led by a head of state from the ethnic minority is negative. In minority led countries in this region, oil abundance increases the probability of civil war, whereas for countries with a leader not affiliated with the minority ethnic group, increased oil wealth decreases the probability of civil war. In Latin America, this is reversed and in Asia, the aggregate effect of oil becomes more positive, meaning increased chances of civil war outbreak, if the country is led by a leader from the ethnic minority.

Table 6 shows the same regional specifications as above, but this time the dependent variable is military expenditure and both pooled OLS and fixed effects have been used to estimate the results. In columns (2) and (3), corresponding to pooled OLS when the sample is restricted to Sub-Saharan Africa and Latin America, only the lagged dependent variable is significant. In column (1) where the focus is on Asia, oil reserves are significant and positive, indicating that increased oil reserves in an Asian country where the head of state is not from the ethnic minority leads to increased military spending. As for the effect of oil reserves in a minority-led country; it becomes positive which is what we expect from the theory. The interaction term between oil and leader affiliation is, however, negative.

Table 5: Regional Effects on the Onset of Civil War

	ASIA	SUBSAHARA	LATAM
	LOG	LOG	LOG
	(1)	(2)	(3)
L.Fearon_war[a]	5.139***	7.228***	6.225***
	(0.337)	(0.557)	(0.609)
Oil reserves (log)[a]	1.736	-5.470	3.117
	(3.531)	(3.683)	(6.509)
Minority leader 1[a]	0.476	0.575	0.800
	(0.324)	(0.435)	(0.817)
Oil and leader affiliation[a]	21.21**	6.348*	-4.064
	(9.101)	(3.505)	(5.130)
GDP (log)[a]	9.304	-115.200	-38.010
	(26.520)	(85.000)	(66.640)
Population (log)[a]	55.88***	9.205	31.530
	(18.940)	(34.430)	(31.610)
Democracy[a]	217.7***	6.438	31.960
	(80.840)	(128.30)	(80.650)
Mountain	-0.004	-0.022	0.005
	(0.009)	(0.017)	(0.017)
Ethnic polarization	0.854	-2.496	-0.228
	(0.934)	(2.338)	(1.384)
Constant	-11.18***	3.876	-4.751
	(3.819)	(9.324)	(5.807)
Observations	907	669	862
Correctly classified	95.48%	98.21%	97.80%

Significance at the 1, 5, and 10 percentage levels are indicated by ***, ** and *, respectively.
Robust standard errors given in parenthesis
[a] Lagged one year

Table 6: Regional Effects on Military Spending

	ASIA POLS	SUBSAHARA POLS	LATAM POLS	ASIA FE	SUBSAHARA FE	LATAM FE
	(1)	(2)	(3)	(4)	(5)	(6)
L.military expenditure[a]	0.279***	0.790***	0.883***	0.181***	0.507***	0.643***
	(0.087)	(0.064)	(0.042)	(0.026)	(0.049)	(0.081)
Oil reserves (log)[a]	11.16**	-0.641	-0.467	232.100	-41.68***	-51.70***
	(5.237)	(0.537)	(1.624)	(174.000)	(8.677)	(6.703)
Minority leader 1[a]	0.359	0.046	0.044	1.897	-9.788***	-0.409
	(0.546)	(0.081)	(0.194)	(1.652)	(3.332)	(1.120)
Oil and leader affiliation[a]	-52.22**	-0.021	1.030	98.910	-57.32***	12.150
	(21.850)	(0.478)	(1.087)	(85.820)	(19.010)	(20.300)
GDP (log)[a]	41.070	-0.528	1.052	-309.800	51.20*	-69.330
	(61.190)	(7.646)	(5.477)	(301.800)	(29.130)	(48.680)
Population (log)[a]	-61.180	-7.052	3.375	700.200	-168.8***	-10.700
	(37.030)	(4.573)	(7.192)	(903.300)	(48.290)	(65.290)
Democracy[a]	-129.200	-25.680	25.320	-132.100	-56.83***	-19.890
	(124.900)	(19.620)	(27.740)	(243.000)	(19.540)	(28.970)
Mountain	-0.005	0.005	0.004			
	(0.015)	(0.003)	(0.003)			
Ethnic polarization	-1.939	-0.147	0.050			
	(1.653)	(0.385)	(0.252)			
Constant	8.355	1.053	-0.631	-35.480	7.576	4.669
	(8.755)	(0.946)	(1.084)	(63.130)	(4.957)	(5.663)
Observations	223	188	157	223	188	157
Number of clusters (numcode)				19	18	15
R-squared	0.569	0.826	0.874	0.216	0.558	0.621
Correctly classified						

Significance at the 1, 5, and 10 percentage levels are indicated by ***, ** and *, respectively.
Robust standard errors given in parenthesis
[a] Lagged one year

When estimating the same model with the same regional specifications using fixed effects, the coefficients for Asia loses all statistic significance (except for the lagged dependent variable). In column (5) the results for Sub-Saharan Africa are reported. The results for the main explanatory variables are all statistically significant, but they are all negative, which is the opposite of what the theory predicts.

7 Sensitivity Analysis Using Alternative Measurements

In this section I present some robustness checks that have been done using alternative measurements for of the main explanatory variables. I will give a short description of the effects that might differ from the main results offered above when different specifications are used.

In table 7 I have repeated the estimations of tables 3 and 4 using ethnic fractionalization from Alesina et al. (2003) instead of the polarization index. The estimations have here been done using OLS when the dependent variable is military expenditure and logit for when the dummy variable for the onset of civil war is set as the dependent variable. Fixed effects has not been used as the diversity measure does not vary over time, only between countries. For the results in table 7 estimated by pooled OLS the signs of the coefficients corresponding to the main variables of interest are the same as in table 4. In column (4) of table 7 the coefficient corresponding to the interaction term between oil and leader affiliation changes sign from negative to positive compared with the main results presented in table 3 when fractionalization is used instead of polarization. This supports the theory, though it is still not statistically significant. The same happens to GDP per capita, but this is not what we would expect from economic theory; higher GDP per capita should lead to lower probability of civil war, not larger. As for the coefficients linked to ethnic diversity they have the same sign whether polarization or fractionalization is used. Positive effects on civil war for the whole sample, negative effects for the MENA countries. It looks as though the effects are stronger in the case where ethnic fractionalization is used, which is clear when comparing the results in columns (1) and (2) in table 7 with the results in columns (1) and (2) in table 4. For columns (3) and (4) in table 7, where logit is used, a quick calculation of the marginal effects confirm this. For polarization the marginal effects are 0.017 and -0.0031 for the whole sample and for the MENA region respectively, and for fractionalization they are calculated to be 2.34 and -2.76.

Measuring ethnic diversity as fractionalization instead of polarization seems to lower the level of significance for the main explanatory variables of interest. The measure for ethnic diversity only seems to be significant when the measure for polarization is used, and then only in two cases, column (2) table 4 and column (2) table 9, ethnic fractionalization never becomes significant. The main difference when using fractionalization instead of polarization is that the interaction term affects civil war positively in column (4), table 7, compared with a negative effect in column (2) in table 3.

Table 7: Ethnic Fractionalization as a Measure of Ethnic Diversity

	ALL POLS (1)	MENA POLS (2)	ALL LOG (3)	MENA LOG (4)
L.military expenditure[a]	0.385***	0.140***		
	(0.139)	(0.040)		
L.Fearon_war[a]			6.089***	4.575***
			(0.215)	(0.725)
Oil reserves (log)[a]	2.843	274.9**	-2.221	6.932
	(2.128)	(90.900)	(1.939)	(65.350)
Minority leader 1[a]	-0.319	9.910*	0.695**	4.548
	(0.470)	(4.340)	(0.310)	(3.764)
Oil and leader affiliation[a]	-3.048	-228.3***	1.469	41.620
	(3.027)	(38.450)	(2.157)	(75.950)
MENA	1.006		0.148	
	(0.866)		(0.425)	
GDP (log)[a]	16.620	-455.600	-34.31**	122.400
	(15.440)	(473.500)	(14.55)	(122.80)
Population (log)[a]	-19.800	5.865	33.36***	111.700
	(13.670)	(51.570)	(9.649)	(71.890)
Democracy[a]	-133.7**	-180.700	47.910	16.580
	(57.130)	(510.900)	(43.100)	(70.470)
Mountain	0.004	-0.148***	-0.001	0.204**
	(0.005)	(0.033)	(0.005)	(0.10)
Ethnic fractionalization	11.720	-293.500	56.3800	-832.100
	(69.300)	(295.400)	(48.970)	(539.100)
Asia	0.695		0.353	
	(0.428)		(0.312)	
Sub-Saharan Africa	-0.380		-0.231	
	(0.370)		(0.341)	
Latin America	-0.224		-0.224	
	(0.304)		(0.341)	
Constant	2.991*	36.350	-5.251***	-27.14*
	(1.629)	(41.790)	(1.549)	(16.49)
Observations	980	106	4,360	472
Number of clusters (numcode)				
R-squared	0.575	0.628		
Correctly classified			97.03%	97.34%

Significance at the 1, 5, and 10 percentage levels are indicated by ***, ** and *, respectively.
Robust standard errors given in parenthesis
[a] Lagged one year

Table 8: Alternative Measures for Minority Leader

	ALL POLS (1)	ALL POLS (2)	ALL FE (3)	ALL FE (4)	ALL LOG (5)	ALL LOG (6)
L.military expenditure[a]	0.378***	0.378***	0.188***	0.188***		
	(0.138)	(0.138)	(0.028)	(0.028)		
L.Fearon_war[a]					6.178***	6.183***
					(0.241)	(0.242)
Oil reserves (log)[a]	3.186	3.073	59.180	59.580	0.204	0.095
	(2.191)	(2.140)	(39.940)	(40.090)	(1.944)	(1.944)
Minority leader 2[a]	-0.359		-0.106		0.406	
	(0.414)		(0.117)		(0.331)	
Minority leader 3[a]		-0.325		0.054		0.504
		(0.436)		(0.159)		(0.343)
Oil and leader affiliation[a]	-4.994	-5.278	-0.797	0.099	-0.568	-0.900
	(3.632)	(3.818)	(1.800)	(2.649)	(2.623)	(2.588)
MENA	0.972	0.994			-0.192	-0.196
	(0.849)	(0.846)			(0.477)	(0.477)
GDP (log)[a]	12.200	13.590	-211.400	-211.600	-44.06***	-41.41**
	(13.750)	(13.560)	(143.200)	(143.000)	(15.980)	(16.260)
Population (log)[a]	-23.510	-23.530	134.100	134.300	29.42***	30.25***
	(16.040)	(16.070)	(251.000)	(252.200)	(11.290)	(11.320)
Democracy[a]	-123.0**	-122.7**	-99.940	-99.690	44.060	46.150
	(59.230)	(59.450)	(67.260)	(67.590)	(47.610)	(47.790)
Mountain	0.004	0.004			-0.0032	-0.0030
	(0.005)	(0.005)			(0.0052)	(0.0052)
Ethnic polarization	-0.022	-0.008			0.577	0.585
	(0.684)	(0.674)			(0.566)	(0.563)
Asia	0.925*	0.934*			0.210	0.221
	(0.511)	(0.514)			(0.367)	(0.366)
Sub-Saharan Africa	-0.416	-0.422			-0.072	-0.095
	(0.428)	(0.431)			(0.347)	(0.349)
Latin America	-0.221	-0.216			0.019	0.021
	(0.277)	(0.279)			(0.377)	(0.379)
Constant	3.687*	3.533*	12.370	12.380	-3.899**	-4.241**
	(2.057)	(2.023)	(10.960)	(11.040)	(1.771)	(1.817)
Observations	895	895	895	895	4,064	4,064
Number of clusters (numcode)			83	83		
R-squared	0.582	0.582	0.187	0.187		
Correctly classified					97.34%	97.34%

Significance at the 1, 5, and 10 percentage levels are indicated by ***, ** and *, respectively.
Robust standard errors given in parenthesis
[a] Lagged one year

In table 8 I have tested whether any of the other measures for ethnic minority leader from Fearon, Kasara, and Laitin (2007), which were described above, might affect the effects on civil war onset or military expenditure. This has been done while using the whole sample, and not looking at MENA specifically. In column (1), (3) and (5) the minority leader 2 measure was used (coding "mestizo" and "white" as the same ethnic group), and in the even numbered columns the minority leader 3 measure (recoding some minority leaders in specific countries as majority leaders) was used. The interaction term was recalculated to incorporate the different measures for leader affiliation.

When the dependent variable is military expenditure and the estimation methods used are pooled OLS and fixed effects, the estimates are very similar to the main results for both alternative measures of minority leader. In fixed effects the only effect that changes sign is the estimate for minority leader 3, which is positive compared to the main results using minority leader 1, where it was negative. This also changes the sign of the interaction term which is positive in column (4) in table 8. This is in line with the theory.

If the dependent variable is the onset of civil war, estimated with logit, oil reserves and the interaction terms have changed signs when using the alternative measures for leader affiliation. The interaction term between oil and leader affiliation now affects the onset of civil war negatively, whereas the probability of civil war will in this case increase if oil reserves increase. In addition, the dummy variable representing whether a country is in Latin America or not now has a positive effect on civil war onset.

When testing whether different measures of leader affiliation affects the results, this has no major effects for the model estimated with pooled OLS. When trying the minority leader 3 measure when fixed effects is used the coefficients for minority leader and for the interaction term become positive, which is in line with the predictions from the theory. In the logistic regression the minority leader 1 measure seems to be the best measure as this leads to higher significance in the explanatory variables and the coefficients here have signs that support the theory.

Table 9: Oil Production as a Measure of Oil Abundance

	ALL POLS (1)	MENA POLS (2)	ALL FE (3)	MENA FE (4)	ALL LOG (7)	MENA LOG (8)
L.military expenditure[a]	0.382***	0.228***	0.189***	0.143***		
	(0.139)	(0.022)	(0.028)	(0.041)		
L.Fearon_war[a]					6.143***	4.490***
					(0.232)	(0.605)
Oil production (log)[a]	2.251	436.8***	3.535	26.630	-1.282	76.470
	(2.103)	(80.120)	(3.298)	(171.600)	(1.909)	(60.190)
Minority leader 1[a]	-0.315	2.569**	-0.131		0.768*	4.483***
	(0.531)	(1.066)	(0.153)		(0.406)	(1.550)
Oil and leader affiliation[a]	-2.093	-318.5***	-1.033	198.500	0.946	0.375
	(2.812)	(30.320)	(1.376)	(168.700)	(2.284)	(54.010)
MENA	1.002				-0.129	
	(0.875)				(0.473)	
GDP (log)[a]	11.440	-623.1*	-234.600	-1,269*	-39.39**	-76.960
	(14.950)	(283.800)	(156.300)	(639.300)	(15.850)	(60.450)
Population (log)[a]	-20.170	15.03	53.090	79.720	35.43***	65.860
	(15.180)	(29.280)	(214.900)	(674.700)	(11.460)	(40.470)
Democracy[a]	-132.6**	540.000	-92.110	11.140	43.160	213.600
	(62.340)	(326.900)	(62.780)	(733.300)	(47.650)	(136.30)
Mountain	0.004	-0.121***			-0.003	0.112**
	(0.005)	(0.025)			(0.005)	(0.051)
Ethnic polarization	0.026	-4.102***			0.533	-1.214
	(0.733)	(1.251)			(0.579)	(1.548)
Asia	0.841*				0.209	
	(0.492)				(0.376)	
Sub-Saharan Africa	-0.406				-0.077	
	(0.413)				(0.353)	
Latin America	-0.216				-0.281	
	(0.322)				(0.338)	
Constant	3.518	58.31**	17.53*	107.6***	-5.055***	-7.072
	(2.116)	(24.250)	(9.945)	(28.840)	(1.789)	(8.470)
Observations	895	116	895	116	4062	482
Number of clusters (numcode)			83	10		
R-squared	0.578	0.627	0.184	0.244		
Correctly classified					97.34%	97.30%

Significance at the 1, 5, and 10 percentage levels are indicated by ***, ** and *, respectively.
Robust standard errors given in parenthesis
[a] Lagged one year

For the last table in this section, table 9, I have used oil production as a proxy for oil abundance, instead of oil reserves. The coefficients in column (1) and (2) of table 9, where pooled OLS was used to find the effects on military expenditure, are very similar to those found in table 4. The only change is that population in the MENA region now has a negative effect on military spending, which is not what might be expected. For the fixed effects results in table 9, the estimations are similar in sign, but the interaction term between oil and leader affiliation in the MENA region becomes larger when oil production instead of reserves are used. In addition, the coefficient linked to democracy now becomes positive, which goes against economic theory.

When looking at the estimates for when the dependent variable is $Fearon\_war$, they are also similar to the ones found in the main results (see table 3). There is only one change in the direction of the effects; the coefficient corresponding to oil and leader affiliation in the MENA region goes from having a negative effect on the probability of civil war to affecting the likelihood of civil war outbreak positively, which is what is expected.

8 Conclusion

In light of the ongoing events connected with the Arab Spring, and in a wider perspective civil wars world wide, the main goal of this thesis has been to build upon the theory devised by Hodler (2012), to test whether his predictions concerning the effect of oil abundance and leader affiliation on the outcomes of the Arab Spring has been correct. Further, I test whether the basis of Hodler's (2012) theory can be used to explain previous conflicts world wide. The theory predicts that a leader affiliated with the country's ethnic minority combined with oil abundance will lead to violent oppression because the leader will pay his own ethnic group to help him remain in power. Firstly, I wanted to find how, if at all, a minority leader combined with oil abundance led to a higher probability of civil war, both for the MENA region specifically and for the world a whole. Secondly, I wanted to find whether an oil abundant country led by a minority leader has a higher defense burden, as not all oppression may lead to conflict and because the defense burden can be seen as a political entry barrier.

The question of whether oil abundance leads to increased probability of civil war has long been researched (e.g. Cotet and Tsui [2013] and Ross [2002]), as has the the effect of ethnic diversity on civil war onset (e.g. Alesina et al. [2003] and Montalvo and Reynal-Querol [2005]), but Hodler's (2012) focus on leader affiliation is novel. As is, as far as I am aware, the effect of oil abundance combined with leader affiliation on conflict and military expenditure. Most previous research has concluded that countries with a minority leader have a slightly larger probability of civil war onset, though not proving a causal relationship. The effect of oil wealth on civil war has many ambiguous results in previous literature, though Cotet and Tsui (2013), which is the empirical approach I follow closely, find that oil abundance has no effect on the onset of civil war, but that it increases the defense burden in non-democracies.

To test the hypothesis of whether or not oil abundance combined with an ethnic minority leader gives an increase in the probability of civil war and a larger defense burden, I have used an extensive and unique data set from Cotet and Tsui (2013) and data from Fearon, Kasara, and Laitin (2007) were a dummy was created as a measure for a minority leader. When looking at the effects on civil war onset, I have used a logistic estimation method, and when studying the effects on the defense burden I used pooled OLS and fixed effects. A few of the estimated parameters I found were encouraging in giving results that corresponded to the theory, but many did not. The general significance of the results was rather low.

When testing the theory with a dummy variable indicating civil war as the dependent variable, the effect of having a minority leader is estimated to be positive and significant for both the whole sample and the subsample containing the MENA region. The interaction term between oil and leader affiliation is positive for the whole sample, but negative for the MENA countries, and further the total effect of oil on the probability of civil war seems to be smaller in the MENA region when the country is lead by a minority leader.

When military spending is the dependent variable, I find that only in the MENA region when using fixed effects does oil seem to have a greater positive effect on military expenditure when the country is led by a minority leader, this is also the only specification in table 4 giving a positive effect from the interaction term. Column (2), where pooled OLS is used on the MENA subsample, is the only specification where all the main explanatory variables are significant, though the effect of the interaction term is negative and thus goes against what the theory predicts.

The regional effects for the onset of civil war when looking at Asia and Sub-Saharan Africa are interesting. The interaction term between oil and leader affiliation, which is the main variable of interest, is positive and significant in both samples. Also, oil abundance affects the probability of civil war more strongly when the leader is affiliated with the ethnic minority in these two regions. These results support the theory.

In general, though, it does not seem as though my results support Hodler's (2012) theory, neither in the world nor in the MENA region. The reasons for this may be many, ranging from endogeneity in the measure of oil reserves or leader affiliation, omitted variables, small subsamples, or more structural reasons. Fearon, Kasara, and Laitin (2007) conclude in their paper that ethnic minority leaders are not likely to explain much of the variance in civil war propensities. Cotet and Tsui (2013) only find that oil wealth has an affect on military spending in non-democracies, not on the onset of civil war. An extension to this thesis might be to divide the data into democratic and non-democratic subsamples and see whether the effect on military spending or on the onset of civil war becomes stronger and more in line with what the theory predicts. One of the most influential papers in the conflict literature, Fearon and Laitin (2003), conclude that factors that favor insurgency; particularly poverty (indicating state weakness), a large population and instability are far better at predicting civil war onset than for example ethnic or religious diversity. They argue that grievances

among rebels are far less important than rebels being able to hide from government forces and whether the economic situation in the country is such that the life of a rebel may seem attractive. Considering that some of the suggested reasons for the Arab Spring were high food prices combined with global famine and a high unemployment rate, especially among the younger population, these reasons may be more suitable to explain why civil war broke out in some of the Arab countries.

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A Appendix

A.1 Descriptive statistics

The table below gives a summary of the main variables of interest and the control variables described in the section concerning the data used in this thesis. In addition it contains information about variables used in the sensitivity analysis described in section 7. All variables are described in the code book and in the general text.

Table 10: Descriptive Statistics

variable	number of observations	mean	std. dev.
Fearon War Dummy	13045	.0986585	.2982144
Military Expenditure	2194	2.853692	4.00175
L.Fearon War[a]	12823	.0986509	.2982043
L.Military Exp[a]	2194	2.853692	4.00175
Oil reserves (log)[a]	7349	-.0914908	.0969821
Oil Production (log)[a]	7372	-.1411073	.1016264
Minority Leader 1[a]	6166	.3352254	.4721075
Minority Leader 2[a]	6171	.2594393	.4383625
Minority Leader 3[a]	6171	.2362664	.4248221
Oil and Leader Affiliation[a,b]	4754	-.0281694	.0706639
Oil and Leader Affiliation 2[a,c]	4754	-.0448835	.087542
Oil and Leader Affiliation 3[a,d]	4759	-.0198889	.0609335
Oil and Leader Affiliation 4[a,e]	4759	-.0187731	.0594862
MENA	17920	.0803571	.2718529
GDP (log)[a]	9330	.0786538	.0105644
Population (log)[a]	10283	.0884075	.0164525
Ethnic Polarization	10960	.5157141	.247922
Ethnic Fractionalization	15120	.004408	.0025728
Democracy[a]	8933	.0050009	.0037075
Mountain	12524	17.2435	21.72289
Sub-Sahara	17920	.1160714	.3203195
Latin America	17920	.0982143	.2976125
Asia	17920	.2098214	.4071924

Minority leader 1 codes "white" leaders as different from "mestizo". Minority leader 2, these ethnic groups are coded as the same. Minority leader 3 recodes leaders in Canada, Belgium, Switzerland, Czechoslovakia, Yugoslavia, and the USSR as leaders from the major ethnic groups.

[a] Lagged on year

[b] interaction term between oil reserves and minority leader 1

[c] interaction term between oil production and minority leader 1

[d] interaction term between oil reserves and minority leader 2

[e] interaction term between oil reserves and minority leader 3

A.2 Countries Included in MENA

Below follows a list of the countries that are included in the MENA region from my data set. This list was found at EIA (2013)

- Bahrain
- Algeria
- Iran
- Iraq
- Isreal
- Jordan
- Kuwait
- Lebanon
- Yemen
- United Arab Emirates
- Libya
- Marocco
- Quatar
- Egypt
- Oman
- Saudi Arabia
- West Bank and Gaza
- Syria
- Tunisia

A.3 Codebook

In this section I present a list of all variables used in the regressions as well as a short description of each of them. As should be clear from the sections describing the variables above, most of these have been taken from Cotet and Tsui (2010), though the variables for leader affiliation were taken from Fearon, Kasara and Laitin (2007)

Panel Indicators

year - the corresponding year in the data

numcode - numerical indicator for the country

code3 - a three letter code indicating country

Main Variables and Control Variables

1. Fearon_war - dummy for war: one if war, zero otherwise. Source: Fearon and Laitin (2003)
2. milexp_pergdpSIPRI - military spending as a fraction of GDP (defense burden). Source: SIPRI
3. LFearon_war - one year lag of Fearon_war
4. LmilexpSIPRI - one year lag of milexp_pergdpSIPRI
5. logvaloilres - log of oil reserves per capita/100 (zeroes replaced by minimum positive values of oil reserves per capita in million barrels per 1000 persons). Source: ASPO
6. min_leader1 - dummy variable for leader affiliation: one if head of state is from countries ethnic minority, zero otherwise. Codes "white" as different from "mestizo". Source: Fearon, Kasara and Laitin (2007)
7. min_leader2 - same as above, though codes "white" as the same ethnic group as "mestizo"
8. min_leader3 - same as above, but recodes some minority leaders as majority leaders in a select number of countries. See subsection on leader affiliation
9. oil_la - interaction term between logvaloilres and one of the dummy variables for minority leaders
10. mena - a dummy indicating if a country is in the MENA region.
11. logpop_M - log of population/100, based on Maddison's Statistics on World Population
12. logGDP_M - log GDP per capita/100

13. democracy - democracy index obtained from polity2 index. Source: Polity IV
14. ethnic_fractionalization - self-explanatory. Source: Alesina et al. (2002)
15. ETHPOL_reynal - measure of ethnic polarization. Source Montalvo and Reynal-Querol (2005)
16. mountain - share of mountainous terrain. Source: Gerrard 2000, cited in Cotet and Tsui 2010
17. asia - dummy variable indicating Asian countries, equal to one if country is in Asia, zero otherwise
18. subsahara - dummy variable indicating a country in Sub-Saharan Africa
19. latam - a dummy indicating a country in Latin America
20. logvalprod - log of the value of oil production/100 (zeroes were replaced by minimum positive value). Source: ASPO